*Stated Meeting, January* 1, 1864.

Present, seventeen members.

The judges and clerks of the annual election held this day, reported the following officers as duly elected:

*President.*

George B. Wood.

*Vice-Presidents.*

John C. Cresson,
Isaac Lea,
George Sharswood.

*Secretaries.*

Charles B. Trego,
E. Otis Kendall,
John L. Le Conte,
J. Peter Lesley.

*Curators.*

Franklin Peale,
Elias Durand,
Joseph Carson.

*Members of the Council for Three Years.*

Alfred L. Elwyn,
John Bell,
Henry Coppée,
Oswald Thompson.

*Treasurer.*

Charles B. Trego.

Photographic portraits of Dr. Hyrtl and Dr. Rokitansky, of Vienna, and of Dr. D. Francis Condie, of Philadelphia, were presented to the Society.

Donations for the Library were received from the Royal

Astronomical Society, the Essex Institute, the Franklin Institute, Dr. Roehrig, and Prof. A. D. Bache.

The death of Lewis Waln, a member of the Society, on the 20th ult., aged 68, was announced by Prof. Trego, and Prof. Cresson was appointed to prepare an obituary notice of the deceased.

Mr. Chase made a communication, in relation to the height of the tides, as connected with atmospherical phenomena, and the diurnal and annual motions of the earth.

The following table furnishes material for many instructive comparisons, some of which deserve special notice on account of the additional confirmations that they furnish to the rotation theory. The column headed "Observed Height of Barometer," gives the grand mean of three years' observations at St. Helena: A represents the theoretical height as computed by our formula; B introduces such modifications as would result from assuming the mean of the equatorial observations as a normal equatorial altitude.

TABLE OF MEAN BAROMETRICAL RESULTS, THEORETICAL AND OBSERVED.

| Time. | Ratio of observed heights. | Observed height of bar 28 in. + | Theoret. height A 28 in. + | Error A. | Theoret. height B 28 in. + | Error B. | Diff. of Errors. |
|---|---|---|---|---|---|---|---|
| 0 h | 1·00060 | ·2985 | ·2970 | —15 | ·3002 | 17 | —32 |
| 1 | 1·00000 | ·2819 | ·2821 | 2 | ·2821 | 2 | 0 |
| 2 | ·99945 | ·2660 | ·2672 | 12 | ·2640 | —20 | 32 |
| 3 | ·99905 | ·2553 | ·2563 | 10 | ·2507 | —46 | 56 |
| 4 | ·99894 | ·2521 | ·2523 | 2 | ·2458 | —63 | 65 |
| 5 | ·99908 | ·2562 | ·2563 | 1 | ·2507 | —55 | 56 |
| 6 | ·99938 | ·2642 | ·2672 | 30 | ·2640 | — 2 | 32 |
| 7 | ·99982 | ·2764 | ·2821 | 57 | ·2821 | 57 | 0 |
| 8 | 1·00028 | ·2899 | ·2970 | 71 | ·3002 | 103 | —32 |
| 9 | 1·00065 | ·3003 | ·3079 | 76 | ·3135 | 132 | —56 |
| 10 | 1·00086 | ·3061 | ·3119 | 58 | ·3184 | 123 | —65 |
| 11 | 1·00074 | ·3025 | ·3079 | 54 | ·3135 | 110 | —56 |
| 12 | 1·00033 | ·2913 | ·2970 | 57 | ·3002 | 89 | —32 |
| 13 | ·99988 | ·2777 | ·2821 | 44 | ·2821 | 44 | 0 |
| 14 | ·99938 | ·2646 | ·2672 | 26 | ·2640 | — 6 | 32 |
| 15 | ·99908 | ·2562 | ·2563 | 1 | ·2507 | —55 | 56 |
| 16 | ·99905 | ·2550 | ·2523 | —27 | ·2458 | —92 | 65 |
| 17 | ·99926 | ·2611 | ·2563 | —48 | ·2507 | —104 | 56 |
| 18 | ·99973 | ·2737 | ·2672 | —65 | ·2640 | —97 | 32 |
| 19 | 1·00028 | ·2898 | ·2821 | —77 | ·2821 | —77 | 0 |
| 20 | 1·00081 | ·3048 | ·2970 | —78 | ·3002 | —46 | —32 |
| 21 | 1·00120 | ·3163 | ·3079 | —84 | ·3135 | —28 | —56 |
| 22 | 1·00130 | ·3184 | ·3119 | —65 | ·3184 | 0 | —65 |
| 23 | 1·00107 | ·3117 | ·3079 | —38 | ·3135 | 18 | —56 |

It will be seen that the purely theoretical height A corresponds more nearly with the observations than the mixed height B. It is therefore evident that there is a slight disturbance (which may perhaps be owing either to variations of temperature, or to a resisting medium), which follows a different law from the principal disturbance.

The changes are least near the times of high and low tide, and greatest midway between the two tides. If we compare the average high and low tides, we see that the observed height is somewhat less at high tide, and somewhat greater at low tide, than theory would give. These results would naturally follow from the combined fluidity and gravitation of the air.

From 1h. to 15h. inclusive (during most of which time the radius vector of each particle of air is increasing), the observed height of the barometer is less than the theoretical height.

From 16h. to 0h. inclusive (radius vector diminishing), the observed height is greater than the theoretical height.

The greater pressure before noon than before midnight, is precisely the result which would follow from the passage of the earth through a resisting medium, but it is directly opposed to the supposed tendencies of varying temperature.

The apparent difference in the laws that govern the aerial and ocean tides may be partially, if not wholly, accounted for by considering the difference of constitution in the two media, and the relative positions of the observer. The air is highly elastic and compressible, while water is cohesive and incompressible; the observer is placed underneath the atmosphere, but above the ocean. The air can therefore readily yield to any expanding or condensing force, without much perceptible motion, while a similar force applied to water would produce motion in the direction of least resistance; any force that tends to throw fluids away from any given portion of the earth, produces a high aerial tide, but a low barometric tide, and after some interval a high oceanic tide.

The frequent coincidence of high water with a low barometer, has been noticed by many observers, and it is strikingly presented in the comparative drawings given by Lubbock, in his Theory of the Tides. The prompt effect of rotation, combined with the retardation of the cumulative action which produces the lunar tides, may perhaps account for the errors of theory in Lubbock's Table of the

SEMI-MENSTRUAL INEQUALITY AT LONDON.

| Apparent solar time of moon's transit B. | | HEIGHT. | | |
|---|---|---|---|---|
| | | Theory. | Observation. | Error. |
| h. | m. | feet. | feet. | feet. |
| 0 | 30 | 22·72 | 22·72 | 0 |
| 1 | 30 | 22·54 | 22·44 | +·10 |
| 2 | 30 | 22·07 | 21·92 | +·15 |
| 3 | 30 | 21·36 | 21·14 | +·22 |
| 4 | 30 | 20·55 | 20·23 | +·32 |
| 5 | 30 | 19·83 | 19·57 | +·26 |
| 6 | 30 | 19·56 | 19·55 | +·01 |
| 7 | 30 | 19·93 | 20·26 | —·33 |
| 8 | 30 | 20·69 | 21·15 | —·46 |
| 9 | 30 | 21·49 | 21·89 | —·40 |
| 10 | 30 | 22·16 | 22·42 | —·26 |
| 11 | 30 | 22·59 | 22·70 | —·11 |

The regular recurrence of the aerial tides at stated hours, is a sufficient evidence of their dependence upon the relative positions of the earth and sun. Though the differential effect of the moon's attraction is greater than that of the sun's, the intensity of the solar attraction is much the greater. I am inclined to believe that this intensity is manifested in a greater stability of the solar attraction-spheroid, which prevents its yielding readily to the effects of rotation.

Lubbock quotes from Williams's Narrative of Missionary Enterprises, p. 172, his remarks on the "well-known fact that the tides in Tahiti and the Society Islands are uniform throughout the year, both as to the time of the ebb and flow, and the height of the rise and fall; it being high water invariably at noon and midnight, and low water at six in the morning and evening. The total range from low to high water seldom exceeds eighteen inches or two feet." The earth's rotation, producing an alternate half-day's acceleration and retardation in the eastward motion of the water, should create a tendency to tides of this character, and the situation of the islands mentioned, is peculiarly favorable for the development of that tendency. Were they near a continent or at the entrance of a gradually narrowing ocean, they would feel the influence of the derivative tide which accumulates the attractive energies of the moon for several successive transits, and the tides would vary with the moon, as upon our own shores: but the nearly uninterrupted ocean sweep of 80° to the eastward may give the combined rotation and solar waves such resistless force, that they can easily overcome the weak intensity

of the lunar attraction. If this hypothesis is confirmed by more accurate observations, the theory of Galileo will not only help us in our explanations of the aerial tides, but it will also lead to the recognition of a most important element in the ocean tides.

Prof. Coppée suggested that the subject of the "Danish Element in England," was worthy of the attention of the Society, describing the traces, still obvious, of the original Celtic and Teutonic occupation of the island. Dr. Washburne spoke of the northern English types, as existing in New England, and were deserving of farther study. Dr. Coates referred to the translation, by early emigrants, of old english names of places to the new localities in New England, which the emigrants occupied; and made further observations upon the origin of human races. Mr. Chase referred to the alleged early settlement of America by the Northmen.

Professor Lesley was nominated Librarian for the ensuing year.

Pending nominations Nos. 506, 507, were read.

And the Society was adjourned.

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*Stated Meeting, January* 15, 1864.

Present, eighteen members.

Dr. Wood, President, in the Chair.

A letter accepting membership was received from Dr. Theodore Schwann, of Liège.

A communication from Mr. H. Stephens, of London, was read, proposing to act as general book agent, in Europe.

Donations for the Library were received from Prof. Zantedeschi, the Hon. J. D. Baldwin, Messrs. Blanchard & Lea, and Mr. C. H. Hart.

Dr. Emerson communicated the following fact, respecting the propagation of atmospheric vibrations to great distances.